

Attachments

- A. Site Visit Report**
- B. Wastewater Treatment Diagrams**
- C. USGS Topographic Map**
- D. Flow Frequency Memorandum**
- E. Ambient Water Quality Information**
 - **2012 305b Watershed Summary Report (Excerpt)**
 - **STORET Data (Station 2-SMH000.08)**
- F. Wasteload and Limit Calculations**
 - **Effluent Data Summary**
 - **Wasteload Allocation Spreadsheet**
 - **STATS Program Results**
 - **Jackson River Benthic TMDL (Excerpt)**
- G. Sludge Analysis**
- H. TMP Justification Memorandum**
- I. Industrial Permit Rating Worksheet**

Attachment A

Site Visit Report

**DEPARTMENT OF ENVIRONMENTAL QUALITY / BLUE RIDGE REGIONAL OFFICE, ROANOKE
FOCUSED CEI WASTEWATER FACILITY INSPECTION REPORT
PREFACE**

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date				
VA0006076	10/16/2009		10/15/2014				
Facility Name	Address		Telephone Number				
Town of Clifton Forge Water Treatment Plant	2500 Sulfur Spring Road Clifton Forge, VA 24422		(540) 863-2522				
Owner Name	Address		Telephone Number				
Town of Clifton Forge	P.O. Box 631 Clifton Forge, VA 24422		(540) 863-2500				
Responsible Official	Title		Telephone Number				
Darlene L. Burcham	Town Manager		(540) 863-2500				
Responsible Operator	Operator Cert. Class/number		Telephone Number				
Robert R. Irvine	Class 3 / 1965001765		(540) 863-2522				
TYPE OF FACILITY:							
DOMESTIC		INDUSTRIAL					
Federal	Major	Major	Primary				
Non-federal	Minor	Minor	X Secondary				
INFLUENT CHARACTERISTICS:		DESIGN:					
	Flow (MGD)	3.0					
	Population Served	NA					
	Connections Served	NA					
	BOD ₅	NA					
	TSS	NA					
EFFLUENT LIMITS: SPECIFY UNITS See attached effluent limitation page.							
Parameter	Minimum	Average	Maximum	Parameter	Minimum	Average	Maximum
	Receiving Stream	Smith Creek					
	Basin	James River (Upper)					
	Discharge Point (LAT)	37° 50' 52.79" N					
	Discharge Point (LONG)	-079° 50' 11.09" W					

Facility: **Town of Clifton Forge Water Treatment Plant**
County/City: **Alleghany County**

VPDES NO. **VA0006076**

DEPARTMENT OF ENVIRONMENTAL QUALITY / BLUE RIDGE REGIONAL OFFICE, ROANOKE
FOCUSED CEI WASTEWATER FACILITY
INSPECTION REPORT
PART 1

Inspection date: **03/18/2014** Date form completed: **04/22/2014** Inspection scheduled: **Y N**
Inspection by: **Gerald A. Duff** Inspection agency: **DEQ/BRRO-R** Inspection announced: **Y N**
Time spent: **20 hours (W/ travel & report)**
Reviewed by: **S. C. Hale**
Present at inspection: **Bobby Irvine - Superintendent & John Riley - Operator**

TYPE OF FACILITY:

☐ Federal ☐ Domestic ☐ Major ☐ Primary
☒ Nonfederal ☒ Industrial ☒ Minor ☐ Secondary

TYPE OF INSPECTION:

☒ Routine Date of last inspection: **08/20/2007**
☐ Compliance/Assistance/Complaint Agency: **DEQ/BRRO**
☐ Reinspection

Population served: **NA** Connections served: **NA**

Last month average: BOD: *mg/L* TSS: *mg/L* Flow: *MGD*
(Influent)

Other:

Last month average: BOD: *mg/L* TSS: **< QL** *mg/L* Flow: **0.030** *MGD*
(Effluent)

February 2014 Other: pH: **6.9** *SU*, TRC: **< QL**

Quarter average: BOD: *mg/L* TSS: **< QL** *mg/L* Flow: **0.034** *MGD*
(Effluent)

Dec. 13 – Feb. 14 Other: pH: **6.9** *SU*, TRC: **< QL**

DATA VERIFIED IN PREFACE ☒ Updated ☐ No changes

Has there been any new construction? ☐ Yes ☒ No

If yes, were plans and specifications approved? ☐ Yes ☐ No ☒ NA

DEQ approval date: **NA**

(A) PLANT OPERATION AND MAINTENANCE

1. Class and number of certified operators: III - 1
2. Hours per day plant is manned: 24 hours/day
3. Describe adequacy of staffing. ☒ Good ☐ Average ☐ Poor
4. Does the plant have an established program for training personnel? ☒ Yes ☐ No
5. Describe the adequacy of the training program. ☐ Good ☒ Average ☐ Poor
6. Are preventive maintenance tasks scheduled? ☒ Yes ☐ No
7. Describe the adequacy of maintenance. ☒ Good ☐ Average ☐ Poor
8. Does the plant experience any organic/hydraulic overloading?
If yes, identify cause and impact on plant: ☐ Yes ☐ No ☒ NA
9. Any bypassing since last inspection? ☐ Yes ☐ No ☒ NA
10. Is the standby electric generator operational? ☐ Yes ☐ No ☒ NA
11. Is the STP alarm system operational? ☐ Yes ☐ No ☒ NA
12. How often is the standby generator exercised? **Weekly**
Power Transfer Switch? Alarm System?
13. When was the cross connection control device last tested on the potable water service? **NA**
14. Is sludge being disposed in accordance with the approved sludge disposal plan? ☒ Yes ☐ No ☐ NA
15. Is septage received by the facility? ☐ Yes ☐ No ☒ NA
Is septage loading controlled? ☐ Yes ☐ No
Are records maintained? ☐ Yes ☐ No
16. Overall appearance of facility: ☒ Good ☐ Average ☐ Poor

Comments:

* Responses with this symbol should be of particular concern and the investigator may want to address the problem in more detail in the Comments Section.

(B) PLANT RECORDS

1. Which of the following records does the plant maintain?

Operational Logs for each unit process	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
Instrument maintenance and calibration	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
Mechanical equipment maintenance	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
Industrial waste contribution (Municipal Facilities)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> NA

2. What does the operational log contain?

<input checked="" type="checkbox"/> Visual observations	<input checked="" type="checkbox"/> Flow measurement
<input checked="" type="checkbox"/> Laboratory results	<input type="checkbox"/> Process adjustments
<input type="checkbox"/> Control calculations	<input type="checkbox"/> Other (specify)

Comments:

3. What do the mechanical equipment records contain?

<input checked="" type="checkbox"/> As built plans and specs	<input type="checkbox"/> Spare parts inventory
<input checked="" type="checkbox"/> Manufacturers instructions	<input checked="" type="checkbox"/> Equipment/parts suppliers
<input type="checkbox"/> Lubrication schedules	<input type="checkbox"/> Other (specify)

Comments:

4. What do the industrial waste contribution records contain (Municipal Only)? **NA**

<input type="checkbox"/> Waste characteristics	<input type="checkbox"/> Locations and discharge types
<input type="checkbox"/> Impact on plant	<input type="checkbox"/> Other (specify)

Comments:

5. Which of the following records are kept at the plant and available to personnel?*

<input checked="" type="checkbox"/> Equipment maintenance records	<input checked="" type="checkbox"/> Operational Log
<input type="checkbox"/> Industrial contributor records	<input checked="" type="checkbox"/> Instrumentation records
<input type="checkbox"/> Sampling and testing records	

6. Records not normally available to plant personnel and their location:

7. Were the records reviewed during the inspection? ☒ Yes ☐ No

8. Are the records adequate and the O & M Manual current? ☒ Yes ☐ No

9. Are the records maintained for the required 3-year time period? ☒ Yes ☐ No

Comments:

(C) SAMPLING

- | | | |
|--|---|---|
| 1. Do sampling locations appear to be capable of providing representative samples? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Do sample types correspond to those required by the VPDES permit? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Do sampling frequencies correspond to those required by the VPDES permit? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Are composite samples collected in proportion to flow? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> NA |
| 5. Are composite samples refrigerated during collection? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> NA |
| 6. Does plant maintain required records of sampling? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 7. Does plant run operational control tests? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

Comments:

(D) TESTING

- | | | | |
|------------------------------|---|--------------------------------------|--|
| 1. Who performs the testing? | <input checked="" type="checkbox"/> Plant | <input type="checkbox"/> Central Lab | <input checked="" type="checkbox"/> Commercial Lab |
|------------------------------|---|--------------------------------------|--|

Name: **REI Consultants, Inc. (VELAP ID# 460148) – Total Suspended Solids****If plant performs any testing, complete 2-4.**

- | | |
|--|---|
| 2. What method is used for chlorine analysis? | SM, 4500-Cl G-2000 (not documented)* |
| 3. Does plant appear to have sufficient equipment to perform required tests? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 4. Does testing equipment appear to be clean and/or operable? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

Comments: **2. All analytical methods must be recorded as specified in the facility's VPDES permit (Part II, Section B.1.e). See the accompanying laboratory inspection report for additional information regarding the analytical methods documentation.**

(E) FOR INDUSTRIAL FACILITIES WITH TECHNOLOGY BASED LIMITS ONLY

- | | | | |
|---|------------------------------|-----------------------------|--|
| 1. Is the production process as described in the permit application? (If no, describe changes in comments) | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> NA |
| 2. Do products and production rates correspond as provided in the permit application? (If no, list differences) | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> NA |
| 3. Has the State been notified of the changes and their impact on plant effluent? Date: | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> NA |

Comments:

Problems identified at last inspection:

Corrected

Not Corrected

No requests for action were noted in the previous inspection.

[X]

[]

SUMMARY

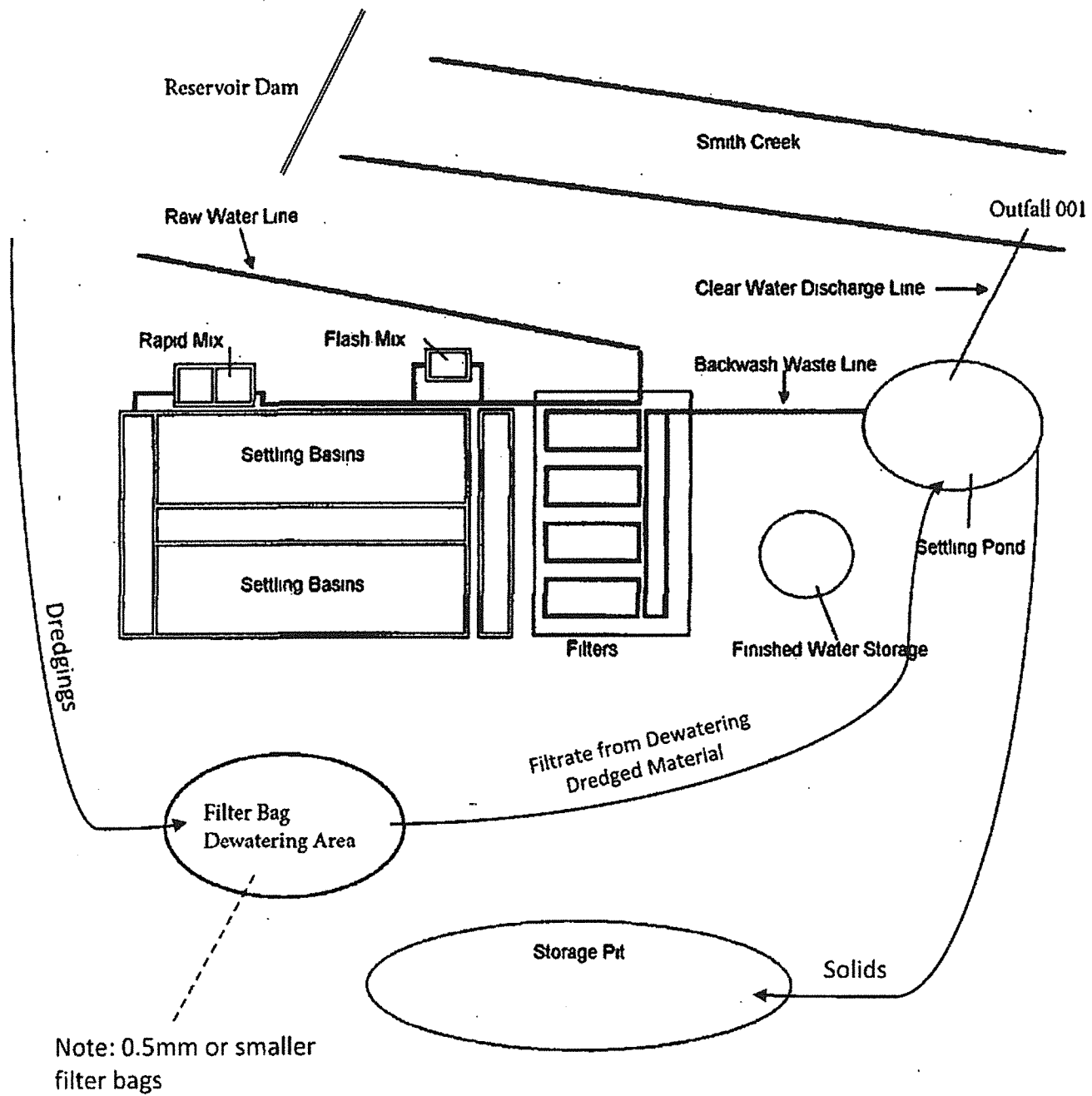
Requests for action:

1. Remove the brush growing in the sludge storage pit before the sludge addition.
2. Analytical methods for all analyses must be documented in accordance with the facility's VPDES permit (Part II, Section B.1.e).

Attachment B

Wastewater Treatment Diagrams

Clifton Forge Water Treatment Plant Flow Schematic



Attachment C

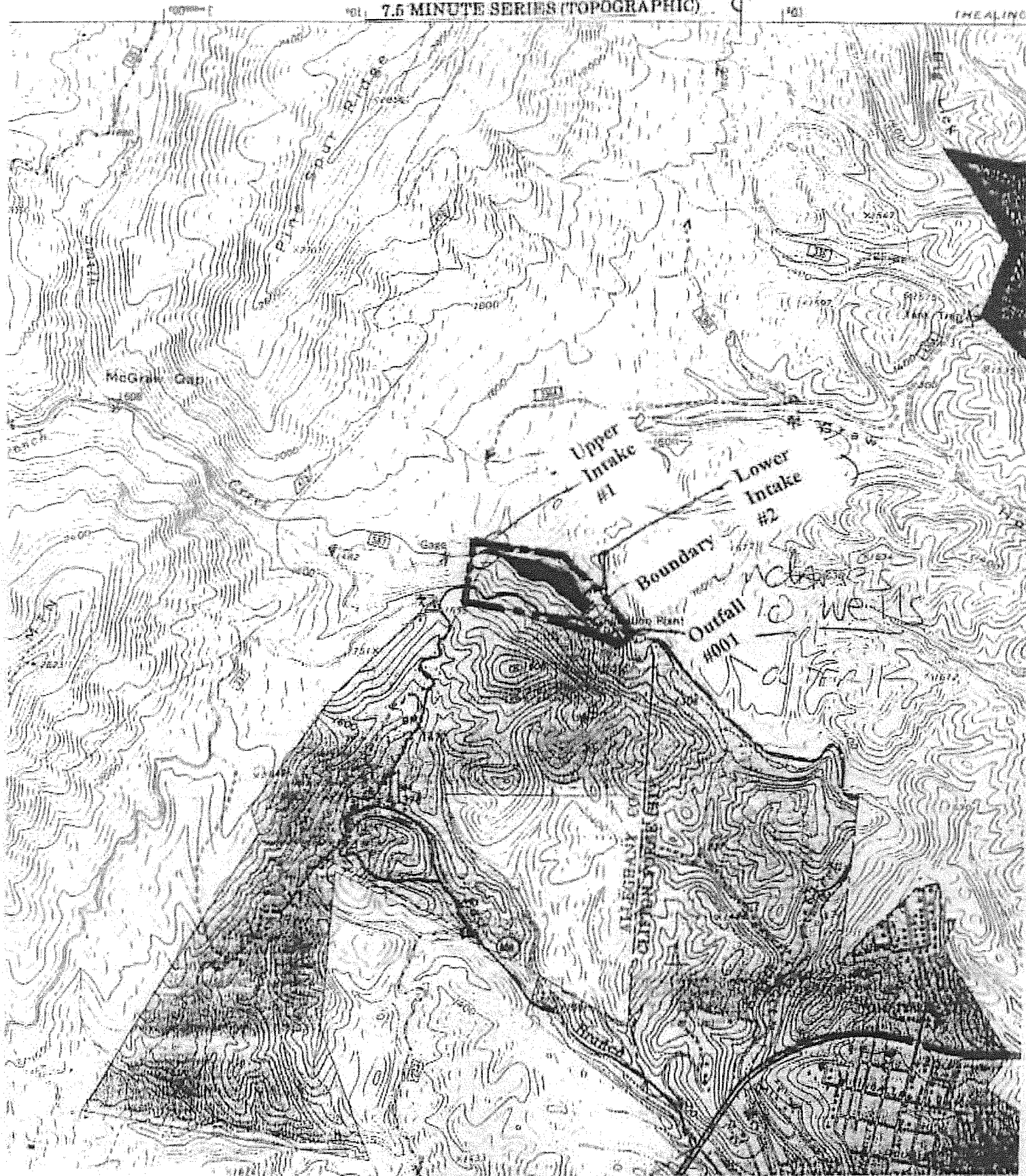
USGS Topographic Map

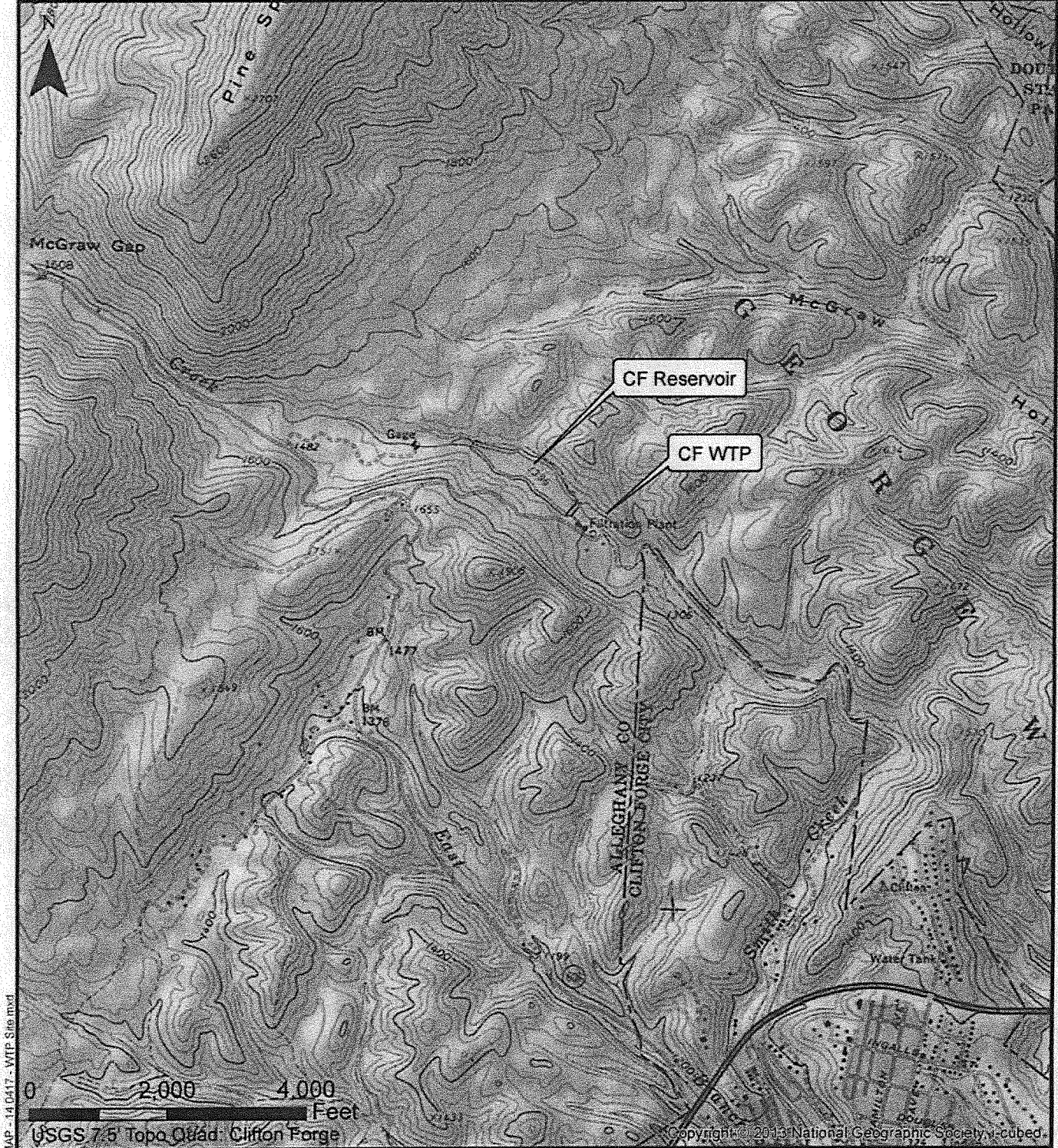
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FIELD FOR USDA FOREST SERVICE USE

CLIFTON FORGE QUADRANGLE
VIRGINIA

PER FILE + R.VINE 714144
NO. 11 25 W/1 0.25 MILES
OF DISCHARGE GEORGE WASHINGTON
JAMES RIVER

7.5 MINUTE SERIES (TOPOGRAPHIC)





Site Location Map
Clifton Forge Reservoir and Water Treatment Plant
Clifton Forge, Virginia

SCALE 1"= 2000'

PLAN NO. B11101B-14A



Draper Aden Associates
 Engineering • Surveying • Environmental Services

2206 South Main Street
 Blacksburg, VA 24060
 540-552-0444 Fax: 540-552-0291

Richmond, VA
 Charlottesville, VA
 Hampton Roads, VA

DESIGNED
 DRAWN
 CHECKED
 DATE

MBJ
 SMF
 KMW
 04/17/14

FIGURE

1

Attachment D

Flow Frequency Memorandum

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY BLUE RIDGE REGIONAL OFFICE

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT TMP for Permit Reissuance for Clifton Forge WTP - VA0006076
TO Permit File
FROM Kevin Harlow, BRRO - Roanoke
DATE September 1, 2009

General Information

The Town of Clifton Forge Water Treatment Plant discharges a maximum daily flow of 0.1 MGD and an average flow of 0.05 MGD. Wastewater is generated from the backwashing of the two filters (0.024 MGD each), from the two mixing basins (0.025 MGD, twice per year), and from the sedimentation basin (0.15 mgd, four days per year).

Based on the previous agency TMP guidance, the permittee maintained an average effluent flow of 0.05 mgd or less in order to not have TMP permit requirements. The permittee has operated and maintained a magnetic flow meter on the discharge to demonstrate that the facility meets the discharge flow TMP criteria. However, current agency TMP guidance (GM00-2012) suggests that all water treatment plants test for toxicity unless there is enough data to demonstrate a lack of toxicity.

Recommendations - Biological Testing

Outfall 001

It is recommended that annual acute toxicity testing begin for evaluation of the toxicity of the discharge associated with the sedimentation basin clean-out using *Ceriodaphnia dubia* and *Pimephales promelas* for multi-dilutional, NOAEC=100% acute testing.

- 1 Guidance Memo 00-2012 recognizes water treatment plant discharges as discharges with the potential to be toxic. There is no toxicity data on file to determine that additional monitoring is not required.

Attachment E

Ambient Water Quality Information

- **2012 305b Watershed Summary Report (Excerpt)**
- **STORET Data (Station 2-SMH000.08)**



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

Cause Group Code: I09R-01-BAC

Smith Creek

Location: Smith Creek mainstem from its mouth on the Jackson River upstream 1.20 miles; the beginning of the WQS natural trout section.

City / County: Alleghany Co.

Use(s): Recreation

Cause(s) /

VA Category: Fecal Coliform/ 5A

2-SMH000.08 (Ridgeway Street - Clifton Forge) There are no additional data beyond the 2006 Integrated Report (IR) and no Escherichia coli (E.coli) data available. The 2004 303(d) Listed waters (1.17 miles) remain. Fecal coliform bacteria (FC) exceeded the former 400 cfu/100 ml instantaneous criterion in eight of 16 observations with values ranging from 500 to 3500 cfu/100 ml. Three of three FC samples exceed in 2010 based on the former criterion ranging from 500 to 1600 cfu/100 ml. The 2008 data window produces the same end results where FC exceeds the former instantaneous criterion in seven of 15 observations with a range of exceedance from 500 to 3500 cfu/100 ml. Escherichia coli (E.coli) will replace fecal coliform bacteria as the indicator as per Water Quality Standards [9 VAC 25-260-170. Bacteria; other waters] when data become available.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-I09R_SMH01A00 / Smith Creek / Smith Creek mainstem from its mouth on the Jackson River upstream ~1.20 miles; the beginning of the WQS natural trout section.	5A Fecal Coliform		2004	2016	1.17

Smith Creek

DCR Watershed: I09*

Recreation

Estuary
(Sq. Miles)

Reservoir
(Acres)

River
(Miles)

Fecal Coliform - Total Impaired Size by Water Type:

1.17

Sources:

Municipal (Urbanized High
Density Area)

Sanitary Sewer Overflows
(Collection System Failures)

Unspecified Domestic
Waste

Wastes from Pets

Wildlife Other than
Waterfowl

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

Cause Group Code: I09R-01-BEN

Jackson River

Location: Jackson River mainstem from the Westvaco main processing outfall downstream to the confluence of Karnes Creek.

City / County: Alleghany Co.

Covington City

Use(s): Aquatic Life

Cause(s) /

VA Category: Benthic-Macroinvertebrate
Bioassessments/ 4A

The Jackson River General Standard - Benthic TMDL received U.S. EPA approval on 7/21/2010. The SWCB approved the Benthic TMDL on 12/9/2010. Federal IDs follow below by 2012 Assessment Units. The original 1996 VAW-I04R and VAW-I09R impairments were combined into one in 2002.

The 1996/1998 originally 303(d) Listed impairments to the benthic community are believed due to nutrient and organic enrichment (deposition) for 24.18 miles. Based on previous ambient station solids data, the nutrients and organics are mainly dissolved. Maxima have been greatly reduced since 1996.

The waters are partially de-listed (shortened- Category 2C) for 9.81 miles from the mouth of Karnes Creek downstream to the confluence of the Cowpasture and Jackson Rivers. The de-listing is based on Virginia Stream Condition Index (VSCI) scores of the 1996-1998 Listed reach currently achieving VSCI scores above 60 from station 2-JKS006.67. VSCI scores at 2-JKS006.67 have steadily increased since 2001. Improvements at discharging facilities have had a positive effect on the benthic community. Both the 2006 and 2012 flow adjusted trend analysis show a significant declining trend for total phosphorus and total nitrogen in both upstream station 2-JKS023.61 and downstream station 2-JKS000.38. 2007 - 2010 VSCI scores from four surveys have an average of 64.10. Benthic trend analysis also shows improving conditions at 2-JKS006.67 (+10 points) over the time period of 1994 - 2010. The VSCI is a multi-metric statewide stream index of biotic integrity that is based on data collected from minimally impacted reference sites throughout Virginia. This index shows that an SCI score of 60.0 is the lower limit for reference (or, unimpaired) conditions in a benthic community.

Federal IDs by Assessment Unit:

VAW-I04R_JKS01A00 - Total Phosphorus - 38981. Total Nitrogen - 39001.
VAW-I09R_JKS01A00 - Total Phosphorus - 39017. Total Nitrogen - 39022. De-list 2012- 3.48 miles.
VAW-I09R_JKS02A00 - Total Phosphorus - 38996. Total Nitrogen - 39003. De-list 2012- 1.71 miles.
VAW-I09R_JKS03A00 - Total Phosphorus - 38997. Total Nitrogen - 39004. De-list 2012- 4.62 miles.
VAW-I09R_JKS03B10 - Total Phosphorus - 38997. Total Nitrogen - 39004.
VAW-I09R_JKS04A00 - Total Phosphorus - 38995. Total Nitrogen - 39002.
VAW-I09R_JKS05A00 - Total Phosphorus - 38998. Total Nitrogen - 39005.
VAW-I09R_JKS06A00 - Total Phosphorus - 38999. Total Nitrogen - 39006.

2012 Benthic Assessment station locations are:

2-JKS000.38 - Rt. 727 Bridge - near Iron Gate (I09R)
2-JKS006.67 - Low Water Bridge - near Dabney Lancaster CC (I09R)
2-JKS013.29 - Off Rt. 696 above Lowmoor (I09R)
2-JKS018.68 - Rt. 18 Bridge at Covington (I09R)
2-JKS020.41 - Upper Horse Shoe at Rayon Terrace (I09R)
2-JKS022.78 - Fudge's Bridge, Rt. 154, Covington (I09R)
2-JKS023.61 - City Park - Covington at gage (I09R)

General Standard (Benthic):

2-JKS023.61-Bio 'IM' The 2012 data window reports an average Virginia Stream Condition Index (VSCI) score of 35.95 from five surveys (2006-2008 & 2010). The lowest score occurs in spring 2007 at 32.92 and the highest 38.47 fall 2008. Seven VSCI surveys (2003 - 2008) for 2010 have an average score of 45.15 with the lowest score in spring 2007 32.92 and highest score 57.38 spring 2004. The 2008 Integrated Report (IR) assessed seven VSCI surveys (2001 - 2006) with

2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

an average score of 34.36; lowest score spring 2001 at 31.03 and highest score 52.38 spring 2004. The invertebrate community at this site has been dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e. Tubificidae, Tricladida, Chironomidae, Lumbriculidae and Simuliidae). The VSCI scores display a negative alteration in the taxonomic diversity and pollution sensitivity of the benthic community. Recent improvement in the historical trend of the benthic community may be due to a reduction in cooling water discharges and efforts in the watershed to reduce nutrient discharge to the river. However, a recently discovered and repaired sewer line contributed pollution to the river and may be responsible for the VSCI decline since 2007.

Both 2006 and 2012 flow adjusted trend analysis find significant declining trends for total phosphorus and total nitrogen at 2-JKS023.61. The 2012 data window finds five of 41 total phosphorus samples are elevated above 0.20 mg/l ranging from 0.24 to 0.52 mg/l; although maxima are reduced. An 'Observed effect' is noted for these waters. Past values above 0.20 have been greater than 1.40 mg/l. The 2010 assessment finds elevated total phosphorus levels in six of 40 samples are above 0.20 mg/l. The maximum value is 0.40 mg/l and the lowest 0.28 mg/l. 2008 elevated total phosphorus levels were 17 of 51 samples- 'Observed Effect'. The maximum value is 1.40 mg/l and the lowest 0.23 mg/l.

2-JKS022.78- There are no additional data beyond the 2010 Integrated Report (IR) where elevated TP values greater than 0.20 mg/l are found in two of 12 samples with excessive values at 0.28 and 0.39 mg/l.

2-JKS020.41- A 2007 probability station. Bio 'IM' Two VSCI surveys (2007), average score 48.13. The invertebrate community at this site is dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e. Tricladida and Asellidae).

2-JKS018.68- Bio 'IM' The 2012 assessment finds from five surveys (2006-2008 & 2010) an average score of 50.37. Five VSCI surveys within the 2010 data window (2004, 2006-2008) have an average score of 54.28. The 2008 assessment reports two VSCI scores from the fall of 2004 (67.3) and 2006 (51.8). The benthic community shows some improvement at this station relative to the station at City Park (2-JKS023.61). However, the benthic community remains dominated by pollution tolerant taxa.

Two total phosphorus observations are elevated within the 2012 data window from 22 samples. Samples greater than 0.20 mg/l are 0.22 and 0.30 mg/l. The 2010 assessment finds two of 16 total phosphorus observations are elevated with excessive values the same as 2012. 2008 assessment TP results find no elevated TP levels above 0.20 mg/l from nine observations (no additional data). The 2006 IR reported six of 18 observations greater than 0.20 mg/l. Elevated TP values ranged from 0.30 to 0.70 mg/l- 'Observed Effect'.

2-JKS013.29- The average VSCI score within the 2012 data window (2006-2008 & 2010) is 54.04. The lowest score is 36.68 (spring 2007) and the highest 61.26 (fall 2006). 2010 results also find an impaired condition with the lowest at 38.6; fall 2004 and the highest 61.26; fall 2006 from six VSCI survey scores (2003, 2004, 2006 & 2007). Lower VSCI scores are the result of the low taxonomic diversity and lack of pollution sensitive taxa. The 2008 IR found impairment from four VSCI surveys (2003 - 2004 & 2006). The Low Moor station through the 2008 assessment has consistently had lower assessment scores and higher numbers of pollution tolerant organisms than at 2-JKS018.68. The 2006 sample showed an increase in pollution sensitive taxa and a decrease in pollution tolerant taxa.

One TP observation from a total of six is greater than 0.20 mg/l at 0.43 mg/L in 2012. There are no additional total phosphorous data within the 2010 data window. 2008 elevated TP samples are found in six of 12 samples with excessive values ranging from 0.29 to 1.41 mg/l- 'Observed Effect'.

2-JKS006.67- Bio 'FS' The 2012 assessment finds 'full support' from four VSCI surveys (2007-2008 & 2010) with an average score of 64.1. 2010 results also find 'full support' from six VSCI surveys (2003-2008) with an average score of 61.2. Benthic trend analysis also shows improving conditions (+10 points) over the time period of 1994 - 2010. VSCI scores have increased by 14 points from 2000-2005; and with an additional increase of 11 points from 2006-2010. There have been slight differences in scores over the current six-year period. Spring scores have been lower than fall scores. Lower VSCI scores are the result of the decrease in pollution sensitive taxa. Recent improvements in the benthic community may be due to a reduction in cooling water discharges and efforts to reduce nutrient discharge to the



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

river. A recently discovered and repaired sewer line may be responsible for the VSCI decline since 2007. The waters in this portion of the of the original 303(d) Listing (9.81 miles) are de-listed with the 2012 assessment based on VSCI scores from both the 2010 and 2012 assessments, Benthic trend analysis and 2006 / 2012 flow adjusted trend analysis at upstream station 2-JKS023.61 and downstream station 2-JKS000.38.

2-JKS000.38- 2006 and 2012 flow adjusted trend analysis reveals significant declining trends in total phosphorus and total nitrogen at this station. The 2012 Integrated Report (IR) finds no elevated TP observations (greater than 0.20 mg/L) from 36 samples. The 2010 assessment finds a single elevated TP observation from 38 observations at 0.22 mg/l. The 2008 assessment reported elevated TP observations in 15 of 50 observations- 'Observed Effect'. Values above 0.20 mg/l range from 0.22 to 1.24 mg/l.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-I09R_JKS03B10 / Jackson River / Jackson River mainstem from upstream of the Lowmoor community downstream to near the mouth of Karnes Creek.	4A Benthic-Macroinvertebrate Bioassessments		1996	7/21/2010	3.18
VAW-I09R_JKS04A00 / Jackson River / Jackson River mainstem from the Covington STP outfall downstream to just above the Lowmoor community.	4A Benthic-Macroinvertebrate Bioassessments		1996	7/21/2010	5.81
VAW-I09R_JKS05A00 / Jackson River / Jackson River mainstem from downstream of the Lexington Avenue Bridge to the City of Covington STP outfall on the Jackson River.	4A Benthic-Macroinvertebrate Bioassessments		1996	7/21/2010	3.26
VAW-I09R_JKS06A00 / Jackson River / Jackson River mainstem from the watershed boundary (I04R) at the mouth of Dunlap Creek downstream to just below the Lexington Avenue Bridge.	4A Benthic-Macroinvertebrate Bioassessments		1996	7/21/2010	1.66
<hr/>					
Jackson River			Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
DCR Watershed: I09*					
Aquatic Life					
Benthic-Macroinvertebrate Bioassessments - Total Impaired Size by Water Type:					13.91

Sources:

Industrial Point Source Discharge

Municipal (Urbanized High Density Area)

Municipal Point Source Discharges

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

Cause Group Code: I09R-01-DO

Jackson River

Location: Jackson River mainstem from the Westvaco main processing outfall downstream to just above the Lowmoor community.

City / County: Alleghany Co.

Covington City

Use(s): Aquatic Life

Cause(s) /

VA Category: Oxygen, Dissolved/ 5A

The original 1998 IDs, VAW-I04R and VAW-I09R, 1996 303(d) Listed dissolved oxygen impairment was combined into one in 2002 for 11.19 miles.

2010 Assessment station locations are:

2-JKS013.29 - Off Rt. 696 above Lowmoor (I09R)

2-JKS018.68 - Rt. 18 Bridge at Covington (I09R)

2-JKS022.15 - Industrial Park behind Walmart

2-JKS023.61 - City Park - Covington at gage (I09R)

Diurnal swings in dissolved oxygen (DO) cause nonsupport of the aquatic life use for a total of 11.19 miles extending from river mile 24.21 (I04R- 0.46 miles) to 13.02 (I09R- 10.73 miles) (37°46'49.59 / 079°55'40.00").

The DO impairment remains for final determination of Use Support via the TMDL Study. 2012 flow adjusted trend analysis finds a significant increasing trend for dissolved oxygen.

2-JKS023.61- Zero excursions of the 4.0 mg/l minimum DO criterion are found from 46 measurements in 2012. The 2010 assessment reports no DO excursions of the minimum criterion from 48 measurements within the ambient monitoring program. The 2008 assessment also found no DO measurements in excess of the DO minimum criterion from 52 observations. However diurnal effects have been noted in previous assessments. The 2004 IR reports DO exceeds the WQS minimum of 4.0 mg/l in six of 26 1998 special study observations as well as those described below at 2-JKS022.15.

Both the 2006 and 2012 flow adjusted trend analysis reveals significant declining trends in total phosphorus and total nitrogen at 2-JKS023.61. However elevated total phosphorus (TP) levels continue with the 2012 assessment where TP results produce five of 41 samples greater than 0.20 mg/l- 'Observed Effect'. Elevated TP samples range from 0.24 to 0.52 mg/l. The 2010 assessment finds six of 40 observations above 0.20 mg/l- 'Observed Effect'. Excessive values range from 0.28 to 0.40 mg/l. 2008 elevated TP levels are found in 17 of 51 samples with a maximum value of 1.40 mg/l and minimum of 0.23 mg/l. 2006 TP concentrations are elevated in 25 of 48 samples with excessive values also ranging from 0.23 to 1.40 mg/l.

2-JKS022.15- 2004 IR reports 1998 DO Recordings find 222 excursions of the minimum 4.0 mg/l WQS criterion from 481 measurements; Diurnal affects are noted. These data are older than 5 years.

2-JKS018.68- Twenty-five DO measurements find no excursions of the 4.0 mg/l minimum criterion within the 2012 data window. No excursions of the minimum criterion are found from 20 observations for the 2010 assessment. DO data within the 2008 data window find no excursions of the 4.0 mg/l minimum criterion from 10 measurements. However diurnal effects have been noted in previous assessments.

2012 TP data greater than 0.20 mg/l are two of 22 measurements.; elevated at 0.22 and 0.30 mg/l. Two of 16 TP samples are elevated above 0.20 mg/l with the 2010 assessment. Excessive values range from 0.22 to 0.30 mg/l. 2008 TP assessment results find no elevated TP levels from nine observations with no additional data beyond the 2006 IR. The 2006 IR reports six of 18 observations in excess of 0.20 mg/l. TP excursions ranged from 0.30 to 0.70 mg/l.

2-JKS013.29- No excursions of the 4.0 mg/l minimum DO criterion are found within the 2012 data window from 9



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

measurements. 2010 DO data report no exceeding values from eight observations. Ambient data within the 2008 assessment data window report no excursions of the WQS minimum criteria for DO. However diurnal effects have been noted in previous assessments.

One elevated TP value (0.43 mg/l) is greater than 0.20 mg/l from nine samples in 2012. Only two TP samples are within the 2010 data window with none greater than 0.20 mg/l. The 2008 IR reports elevated TP above 0.20 mg/l in six of 12 samples with excessive values ranging from 0.29 to 1.41 mg/l- 'Observed Effect'.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-I09R_JKS04A00 / Jackson River / Jackson River mainstem from the Covington STP outfall downstream to just above the Lowmoor community.	5A Oxygen, Dissolved		1996	2010	5.81
VAW-I09R_JKS05A00 / Jackson River / Jackson River mainstem from downstream of the Lexington Avenue Bridge to the City of Covington STP outfall on the Jackson River.	5A Oxygen, Dissolved		1996	2010	3.26
VAW-I09R_JKS06A00 / Jackson River / Jackson River mainstem from the watershed boundary (I04R) at the mouth of Dunlap Creek downstream to just below the Lexington Avenue Bridge.	5A Oxygen, Dissolved		1996	2010	1.66
<hr/>					
Jackson River			Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
DCR Watershed: I09*					
Aquatic Life					
Oxygen, Dissolved - Total Impaired Size by Water Type:					10.73

Sources:

Industrial Point Source
Discharge

Municipal Point Source
Discharges

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

Cause Group Code: I09R-01-PCB

Jackson River

Location: The Jackson River from the Covington water intake downstream to just above the Lowmoor community.

City / County: Alleghany Co.

Covington City

Use(s): Fish Consumption

Cause(s) /

VA Category: PCB in Fish Tissue/ 5A

The 2008 Integrated Report produces the initial 303(d) Listing of these waters for a total of 12.43 miles.

2-JKS023.88 (Covington City Park) 2005 fish tissue collections find exceedances above the former WQS based PCB TV of 54 ppb (VDH 50) from a single species. Two carp are found with tissue values of 66.4 (68.0 cm) and 71.3 ppb (61.31 cm). Application of the new WQS of 20 ppb adds three additional carp sizes (63.9 cm) exceeding at 28.81 ppb, (63.2 cm) at 35.96 and (51-58 cm) at 37.48 ppb.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-I09R_JKS04A00 / Jackson River / Jackson River mainstem from the Covington STP outfall downstream to just above the Lowmoor community.	5A PCB in Fish Tissue		2008	2020	5.81
VAW-I09R_JKS05A00 / Jackson River / Jackson River mainstem from downstream of the Lexington Avenue Bridge to the City of Covington STP outfall on the Jackson River.	5A PCB in Fish Tissue		2008	2020	3.26
VAW-I09R_JKS06A00 / Jackson River / Jackson River mainstem from the watershed boundary (I04R) at the mouth of Dunlap Creek downstream to just below the Lexington Avenue Bridge.	5A PCB in Fish Tissue		2008	2020	1.66

Jackson River

DCR Watershed: I09*

Fish Consumption

Estuary
(Sq. Miles)

Reservoir
(Acres)

River
(Miles)

PCB in Fish Tissue - Total Impaired Size by Water Type:

10.73

Sources:

Source Unknown

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

Cause Group Code: I09R-02-BAC

Jackson River

Location: Jackson River mainstem from the Covington water intake downstream to just above the Lowmoor Community.

City / County: Alleghany Co.

Covington City

Use(s): Recreation

Cause(s) /

VA Category: Escherichia coli/ 5A

The original 3.36 mile waters were 1998 303(d) listed for fecal coliform (FC) bacteria and delisted for bacteria October 2005 as approved by the U.S. EPA (Fed. ID - NA) where only one exceedance from 24 observations are reported via the 2006 Integrated Report (IR) for Escherichia coli (E. coli) bacteria.

The bacteria impairment returned with the 2008 IR based on E. coli excursions at 2-JKS023.61. Data within the 2010 data window results in an additional extension of the impairment from stations 2-JKS018.68 and 2-JKS015.60. The impairment extends a total of 12.43 miles.

2-JKS023.61 (Covington City Park) Seventeen of 37 E.coli samples exceed the 235 cfu/100 ml instantaneous criterion within the 2012 data window. Excessive values range from 250 cfu/100 ml to greater than 2000. 2010 results produce nine of 33 Escherichia coli (E. coli) observations in excess of the instantaneous criterion. Exceeding values range from 320 to 1400 cfu/100 ml. 2008 IR found four of 27 E. coli observations in excess of the instantaneous criterion. Exceeding values range from 250 to 1400 cfu/100 ml.

2-JKS018.68 (Rt. 8 Bridge at Covington) There are no additional E.coli data within the 2012 data window. Three of 12 E. coli observations exceed 235 cfu/100 ml ranging from 550 to 380 cfu/100 ml in 2010.

2-JKS015.60 (K-Mart Parking Lot, SE corner) There are no additional E.coli data within the 2012 data window. 2010 E. coli observations exceed the 235 cfu/100 ml criterion in two of 12 observations. Exceeding values range from 250 to 450 cfu/100 ml.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-I09R_JKS04A00 / Jackson River / Jackson River mainstem from the Covington STP outfall downstream to just above the Lowmoor community.	5A Escherichia coli		2010	2020	5.81
VAW-I09R_JKS05A00 / Jackson River / Jackson River mainstem from downstream of the Lexington Avenue Bridge to the City of Covington STP outfall on the Jackson River.	5A Escherichia coli		2010	2020	3.26
VAW-I09R_JKS06A00 / Jackson River / Jackson River mainstem from the watershed boundary (I04R) at the mouth of Dunlap Creek downstream to just below the Lexington Avenue Bridge.	5A Escherichia coli		2008	2020	1.66

Jackson River

DCR Watershed: I09*

Recreation

Estuary
(Sq. Miles)

Reservoir
(Acres)

River
(Miles)

Escherichia coli - Total Impaired Size by Water Type:

10.73



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

Sources:

Municipal (Urbanized High
Density Area)

Sanitary Sewer Overflows
(Collection System Failures)

Urban Runoff/Storm Sewers

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: I09*

Cause Group Code: I09R-03-BAC

Jackson River

Location: Jackson River mainstem from the US 60 crossing downstream to the Jackson River confluence with the Cowpasture River.

City / County: Alleghany Co.

Use(s): Recreation

Cause(s) /

VA Category: Escherichia coli/ 5A

The Recreational Use is not supported due to Escherichia coli (E.coli) excursions of the WQS instantaneous criterion within the 2012 data window.

2-JKS000.38 (Rt. 727 Bridge near Iron Gate) E.coli observations find four excursions of the 235 cfu/100 ml instantaneous criterion from 36 samples. Exceedances range from 250cfu/100 ml to 480.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-I09R_JKS01A00 / Jackson River / Jackson River mainstem from the Clifton Forge STP outfall downstream to the Jackson River confluence with the Cowpasture River.	5A Escherichia coli		2012	2024	3.48
VAW-I09R_JKS02A00 / Jackson River / Jackson River mainstem from the US 60 crossing downstream to the Clifton Forge STP outfall.	5A Escherichia coli		2012	2024	1.71

Jackson River

DCR Watershed: I09*

Recreation

Estuary (Sq. Miles) Reservoir (Acres) River (Miles)

Escherichia coli - Total Impaired Size by Water Type:

5.19

Sources:

Sanitary Sewer Overflows
(Collection System Failures)

Urban Runoff/Storm Sewers

Wet Weather Discharges
(Non-Point Source)

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.

Clifton Forge WTP VPDES Permit VA0006076
Station ID 2 SMH000 08 Ridgeway Street in Clifton Forge

Date	Field_pH	Temp_Celsius	Hardness (mg/L CaCO3)	Wet Season
1/3/1989	7.72	5.3	38	1
4/24/1989	7.64	11.6	46	1
1/2/1990	7.59	4.5	16	1
4/2/1990	7.73	11.6	36	1
1/2/1991	8.49	6.7	20	1
2/3/1992	8.4	3.2	52	1
5/5/1992	8.6	12.6	37	1
2/9/1993	8.8	4.9	30	1
5/11/1993	7.8	16.5	32	1
2/7/1994	8.7	3.8	38	1
5/3/1994	7.8	13.6	50	1
12/11/2000	7.8	3.8	54.4	1
2/6/2001	8.3	4.3	40.3	1
4/3/2001	8.4	8.4	10.3	1
2/19/2002	7.74	2.8	13.2	1
4/17/2002	7.28	16.06	23.2	1
2/4/2003	8.18	6.3	45.4	1
3/3/2003	8.48	6.9	19.4	1
5/27/2003	7.23	13.49	22.6	1
10/5/1988	6.98	13.7	93	0
7/5/1989	8.22	19.1	50	0
7/2/1990	7.73	20.6	68	0
7/2/1991	8.5	23.9	64	0
9/5/1991	8.34	23.2	84	0
6/24/1992			41	0
8/6/1992	7.9	18.8	74	0
11/4/1992	8.1	10.7	78	0
8/10/1993			78	0
11/2/1993	7.5	6.6	86	0
8/8/2000	8	22.7	43.7	0
6/7/2001	8.3	20.7	46.2	0
7/19/2001	8.39	22.5	39.7	0
9/10/2001	8.63	22.4	58.7	0
11/28/2001	8.34	12.4	37.6	0
6/11/2002	7.74	23.29	53.5	0
8/7/2002	7.58	20.37	68.8	0
10/15/2002	8.18	12.8	64.3	0
6/25/2003	7.41	17	25.1	0
10th Percentile	7.455			
90th Percentile	8.55	22.6		
Average			46.77368421	
90th Percentile (Wet Season)		14.092		

Date	Parameter Name	Value
6/28/2001	ARSENIC AS DISS UG/L	0.43
6/28/2001	COPPER CU DISS UG/L	0.25
6/28/2001	NICKEL NI DISS UG/L	0.53

Attachment F

Wasteload and Limit Calculations

- **Effluent Data Summary**
- **Wasteload Allocation Spreadsheet**
- **STATS Program Results**
- **Jackson River Benthic TMDL (Excerpt)**

EFFLUENT DATA

Parameter Description	Due Date	CL2-Avg (ug/L)	CL2-Max (ug/L)	pH-Min (s.u.)	pH-Max (s.u.)	TSS-Avg (mg/L)	TSS-Max (mg/L)	Flow-Avg (MGD)	Flow-Max (MGD)
CL2, TOTAL	10-Nov-2009	0	0	7.5	7.5	1.46	1.46	0.048	0.055
CL2, TOTAL	10-Dec-2009	0	0	7.4	7.4	1.22	1.22	0.051	0.061
CL2, TOTAL	10-Jan-2010	0	0	7.4	7.4	3.1	3.1	0.03	0.058
CL2, TOTAL	10-Feb-2010	0	0	7.4	7.4	1.6	1.6	0.056	0.071
CL2, TOTAL	10-Mar-2010	0	0	7.3	7.3	1.29	1.29	0.042	0.091
CL2, TOTAL	10-Apr-2010	0	0	7.4	7.4	0	0	0.04	0.081
CL2, TOTAL	10-May-2010	0	0	7.4	7.4	1.18	1.18	0.038	0.09
CL2, TOTAL	10-Jun-2010	0	0	7.4	7.4	2.01	2.01	0.052	0.09
CL2, TOTAL	10-Aug-2010	0	0	7.5	7.5	1	1	0.055	0.069
CL2, TOTAL	10-Sep-2010	0	0	7.3	7.3	0	0	0.046	0.072
CL2, TOTAL	10-Oct-2010	0	0	7.2	7.2	0	0	0.046	0.088
CL2, TOTAL	10-Nov-2010	0	0	7.7	7.7	0	0	0.037	0.083
CL2, TOTAL	10-Dec-2010	0	0	7.7	7.7	0	0	0.05	0.096
CL2, TOTAL	10-Jan-2011	0	0	7.8	7.8	1.5	1.5	0.043	0.095
CL2, TOTAL	10-Feb-2011	0	0	7.7	7.7	0	0	0.031	0.092
CL2, TOTAL	10-Mar-2011	0	0	7.8	7.8	1.6	1.6	0.038	0.088
CL2, TOTAL	10-Apr-2011	0	0	7.4	7.4	1	1	0.054	0.093
CL2, TOTAL	10-May-2011	0	0	7.4	7.4	0	0	0.032	0.091
CL2, TOTAL	10-Jun-2011	0	0	7.4	7.4	0	0	0.049	0.089
CL2, TOTAL	10-Jul-2011	0	0	7.5	7.5	1.18	1.18	0.043	0.089
CL2, TOTAL	10-Aug-2011	0	0	7.4	7.4	0	0	0.046	0.091
CL2, TOTAL	10-Sep-2011	0	0	7.7	7.7	1.2	1.2	0.049	0.089
CL2, TOTAL	10-Oct-2011	0	0	7.7	7.7	0	0	0.041	0.075
CL2, TOTAL	10-Nov-2011	0	0	7.8	7.8	0	0	0.044	0.097
CL2, TOTAL	10-Dec-2011	0	0	7.9	7.9	0	0	0.043	0.08
CL2, TOTAL	10-Jan-2012	0	0	7.7	7.7	1	1	0.045	0.096
CL2, TOTAL	10-Feb-2012	0	0	7.7	7.7	2	2	0.038	0.086
CL2, TOTAL	10-Mar-2012	0	0	7.8	7.8	1	1	0.04	0.082
CL2, TOTAL	10-Apr-2012	0	0	7.7	7.7	8	8	0.045	0.096
CL2, TOTAL	10-May-2012	0	0	7.8	7.8	1	1	0.036	0.081
CL2, TOTAL	10-Jun-2012	0	0	7.8	7.8	1	1	0.036	0.077
CL2, TOTAL	10-Jul-2012	0	0	8	8	0	0	0.038	0.078
CL2, TOTAL	10-Aug-2012	0	0	7.7	7.7	1	1	0.039	0.089
CL2, TOTAL	10-Sep-2012	0	0	7.5	7.5	1	1	0.039	0.093
CL2, TOTAL	10-Oct-2012	0	0	7.7	7.7	1	1	0.039	0.091
CL2, TOTAL	10-Nov-2012	0	0	7.2	7.2	1	1	0.033	0.072
CL2, TOTAL	10-Dec-2012	0	0	7.9	7.9	1	1	0.038	0.078
CL2, TOTAL	10-Jan-2013	0	0	7.7	7.7	1	1	0.023	0.084
CL2, TOTAL	10-Feb-2013	0	0	7.8	7.8	10	10	0.029	0.083
CL2, TOTAL	10-Mar-2013	0	0	7.7	7.7	2	2	0.053	0.08
CL2, TOTAL	10-Apr-2013	0	0	7.6	7.6	1	1	0.033	0.086
CL2, TOTAL	10-May-2013	0	0	7.7	7.7	1	1	0.027	0.087
CL2, TOTAL	10-Jun-2013	0	0	7.6	7.6	1	1	0.028	0.089
CL2, TOTAL	10-Jul-2013	0	0	7.9	7.9	1	1	0.027	0.074
CL2, TOTAL	10-Aug-2013	0	0	7.6	7.6	0	0	0.027	0.088
CL2, TOTAL	10-Sep-2013	0	0	7.7	7.7	2	2	0.027	0.082
CL2, TOTAL	10-Oct-2013	0	0	7.5	7.5	0	0	0.061	0.084
CL2, TOTAL	10-Nov-2013	0	0	7.4	7.4	0	0	0.023	0.097
CL2, TOTAL	10-Dec-2013	0	0	7.4	7.4	0	0	0.028	0.082
CL2, TOTAL	10-Jan-2014	0	0	7.5	7.5	0	0	0.041	0.099
CL2, TOTAL	10-Feb-2014	0	0	7.6	7.6	0	0	0.032	0.093
CL2, TOTAL	10-Mar-2014	0	0	6.9	6.9	0	0	0.03	0.095
CL2, TOTAL	10-Apr-2014	0	0	6.8	6.8	0	0	0.035	0.085
CL2, TOTAL	10-May-2014	0	0	7.4	7.4	0	0	0.057	0.076
CL2, TOTAL	10-Jun-2014	0	0	7.4	7.4	0	0	0.065	0.095
CL2, TOTAL	10-Jul-2014	0	0	6.9	6.9	0	0	0.019	0.086
CL2, TOTAL	10-Aug-2014	0	0	7.1	7.1	1	1	0.063	0.08
Averages		0	0	7.5	7.5	1.0	1.0	0.040	0.085

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Cliffon Forge WTP

Permit No.: VA0006076

Receiving Stream: Smith Creek

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO ₃) =	46.8 mg/L	1Q10 (Annual) =	0 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO ₃) =	46.8 mg/L
90% Temperature (Annual) =	22.6 deg C	7Q10 (Annual) =	0 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	20 deg C
90% Temperature (Wet season) =	14.1 deg C	30Q10 (Annual) =	0 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	20 deg C
90% Maximum pH =	8.55 SU	1Q10 (Wet season) =	0 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	7.7 SU
10% Maximum pH =	7.46 SU	30Q10 (Wet season) =	0 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6.75 SU
Tier Designation (1 or 2) =	2	30Q5 =	0 MGD			Discharge Flow =	0.05 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	0.57 MGD				
Trout Present Y/N? =	y						
Early Life Stages Present Y/N? =	n						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Acenaphthene	0	-	-	na	9.9E+02	-	-	na	9.9E+01	-	-	na	9.9E+01	-	-	na
Acrolein	0	-	-	na	9.3E+00	-	-	na	9.3E-01	-	-	na	9.3E-01	-	-	na
Acrylonitrile ^c	0	-	-	na	2.5E+00	-	-	na	2.5E-01	-	-	na	3.1E+00	-	-	na
Aldrin ^c	0	3.0E+00	-	na	5.0E-04	3.0E+00	-	na	5.0E-05	7.5E-01	-	na	6.2E-04	7.5E-01	-	na
Ammonia-N (mg/l) (Yearly)	0	9.64E+00	2.51E+00	na	-	9.64E+00	2.51E+00	na	-	2.41E+00	6.28E-01	na	-	2.41E+00	6.28E-01	na
Ammonia-N (mg/l) (High Flow)	0	9.64E+00	2.51E+00	na	-	9.64E+00	2.51E+00	na	-	2.41E+00	6.28E-01	na	-	2.41E+00	6.28E-01	na
Anthracene	0	-	-	na	4.0E+04	-	-	na	4.0E+03	-	-	na	4.0E+03	-	-	na
Antimony	0	-	-	na	6.4E+02	-	-	na	6.4E+01	-	-	na	6.4E+01	-	-	na
Arsenic	0.43	3.4E+02	1.5E+02	na	-	3.4E+02	1.5E+02	na	-	8.5E+01	3.8E+01	na	-	8.5E+01	3.8E+01	na
Barium	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na
Benzene ^c	0	-	-	na	5.1E+02	-	-	na	5.1E+01	-	-	na	6.3E+02	-	-	na
Benzidine ^c	0	-	-	na	2.0E-03	-	-	na	2.0E-04	-	-	na	2.5E-03	-	-	na
Benzo (a) anthracene ^c	0	-	-	na	1.8E-01	-	-	na	1.8E-02	-	-	na	2.2E-01	-	-	na
Benzo (b) fluoranthene ^c	0	-	-	na	1.8E-01	-	-	na	1.8E-02	-	-	na	2.2E-01	-	-	na
Benzo (k) fluoranthene ^c	0	-	-	na	1.8E-01	-	-	na	1.8E-02	-	-	na	2.2E-01	-	-	na
Benzo (a) pyrene ^c	0	-	-	na	1.8E-01	-	-	na	1.8E-02	-	-	na	2.2E-01	-	-	na
Bis(2-Chloroethyl) Ether ^c	0	-	-	na	5.3E+00	-	-	na	5.3E-01	-	-	na	6.6E+00	-	-	na
Bis(2-Chloroisopropyl) Ether ^c	0	-	-	na	6.5E+04	-	-	na	6.5E+03	-	-	na	6.5E+03	-	-	na
Bis 2-Ethylhexyl Phthalate ^c	0	-	-	na	2.2E+01	-	-	na	2.2E+00	-	-	na	2.7E+01	-	-	na
Bromoform ^c	0	-	-	na	1.4E+03	-	-	na	1.4E+02	-	-	na	1.7E+03	-	-	na
Butylbenzylphthalate	0	-	-	na	1.9E+03	-	-	na	1.9E+02	-	-	na	1.9E+02	-	-	na
Cadmium	0	1.7E+00	6.2E-01	na	-	1.7E+00	6.2E-01	na	-	4.2E-01	1.6E-01	na	-	4.2E-01	1.6E-01	na
Carbon Tetrachloride ^c	0	-	-	na	1.6E+01	-	-	na	1.6E+00	-	-	na	2.0E+01	-	-	na
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.1E-04	6.0E-01	1.1E-03	na	1.0E-02	6.0E-01	1.1E-03	na
Chloride	0	8.6E+05	2.3E+05	na	-	8.6E+05	2.3E+05	na	-	2.2E+05	5.8E+04	na	-	2.2E+05	5.8E+04	na
TRC	0	1.9E+01	1.1E+01	na	-	1.9E+01	1.1E+01	na	-	4.8E+00	2.8E+00	na	-	4.8E+00	2.8E+00	na
Chlorobenzene	0	-	-	na	1.6E+03	-	-	na	1.6E+02	-	-	na	1.6E+02	-	-	na

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^c	0	--	--	na	1.3E+02	--	--	na	1.6E+03	--	--	na	1.3E+01	--	--	na	1.6E+02	--	--	na	1.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--	na	1.1E+03
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	na	1.6E+02
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	na	1.5E+01	--	--	na	1.5E+01	--	--	na	1.5E+01
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	2.1E-02	1.0E-02	na	--	2.1E-02	1.0E-02	na	--	2.1E-02	1.0E-02	na	--
Chromium III	0	3.1E+02	4.0E+01	na	--	3.1E+02	4.0E+01	na	--	7.6E+01	9.9E+00	na	--	7.6E+01	9.9E+00	na	--	7.6E+01	9.9E+00	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	4.0E+00	2.8E+00	na	--	4.0E+00	2.8E+00	na	--	4.0E+00	2.8E+00	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	1.0E+01	--	--	--	na	--
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	2.2E-01	--	--	na	1.8E-03	--	--	na	2.2E-02	--	--	na	2.2E-02
Copper	0.25	6.6E+00	4.7E+00	na	--	6.6E+00	4.7E+00	na	--	1.8E+00	1.4E+00	na	--	1.8E+00	1.4E+00	na	--	1.8E+00	1.4E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	1.6E+04	5.5E+00	1.3E+00	na	1.6E+03	5.5E+00	1.3E+00	na	1.6E+03	5.5E+00	1.3E+00	na	1.6E+03
DDD ^c	0	--	--	na	3.1E-03	--	--	na	3.8E-02	--	--	na	3.1E-04	--	--	na	3.8E-03	--	--	na	3.8E-03
DDE ^c	0	--	--	na	2.2E-03	--	--	na	2.7E-02	--	--	na	2.2E-04	--	--	na	2.7E-03	--	--	na	2.7E-03
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.7E-02	2.8E-01	2.5E-04	na	2.2E-04	2.8E-01	2.5E-04	na	2.7E-03	2.8E-01	2.5E-04	na	2.7E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	2.5E-02	na	--	--	2.5E-02	na	--	--	2.5E-02	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	4.3E-02	4.3E-02	na	--	4.3E-02	4.3E-02	na	--	4.3E-02	4.3E-02	na	--
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	2.2E+00	--	--	na	1.8E-02	--	--	na	2.2E-01	--	--	na	2.2E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	na	1.3E+02
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	9.6E+02	--	--	na	9.6E+01	--	--	na	9.6E+01	--	--	na	9.6E+01
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--	na	1.9E+01	--	--	na	1.9E+01	--	--	na	1.9E+01
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	3.5E+00	--	--	na	2.8E-02	--	--	na	3.5E-01	--	--	na	3.5E-01
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	2.1E+03	--	--	na	1.7E+01	--	--	na	2.1E+02	--	--	na	2.1E+02
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	4.6E+03	--	--	na	3.7E+01	--	--	na	4.6E+02	--	--	na	4.6E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.1E+03	--	--	na	7.1E+02	--	--	na	7.1E+02	--	--	na	7.1E+02
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	na	1.0E+03	--	--	na	1.0E+03	--	--	na	1.0E+03
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--	na	2.9E+01	--	--	na	2.9E+01	--	--	na	2.9E+01
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	1.9E+03	--	--	na	1.5E+01	--	--	na	1.9E+02	--	--	na	1.9E+02
1,3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	2.6E+03	--	--	na	2.1E+01	--	--	na	2.6E+02	--	--	na	2.6E+02
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	6.7E-03	6.0E-02	1.4E-02	na	5.4E-05	6.0E-02	1.4E-02	na	6.7E-04	6.0E-02	1.4E-02	na	6.7E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.4E+04	--	--	na	4.4E+03	--	--	na	4.4E+03	--	--	na	4.4E+03
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	8.5E+02	--	--	na	8.5E+01	--	--	na	8.5E+01	--	--	na	8.5E+01
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.1E+06	--	--	na	1.1E+05	--	--	na	1.1E+05	--	--	na	1.1E+05
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.5E+03	--	--	na	4.5E+02	--	--	na	4.5E+02	--	--	na	4.5E+02
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	na	5.3E+02	--	--	na	5.3E+02	--	--	na	5.3E+02
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	na	2.8E+01	--	--	na	2.8E+01	--	--	na	2.8E+01
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	4.2E+02	--	--	na	3.4E+00	--	--	na	4.2E+01	--	--	na	4.2E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.1E-08	--	--	na	5.1E-09	--	--	na	5.1E-09	--	--	na	5.1E-09
1,2-Diphenylhydrazine ^c	0	--	--	na	2.0E+00	--	--	na	2.5E+01	--	--	na	2.0E-01	--	--	na	2.5E+00	--	--	na	2.5E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	5.5E-02	1.4E-02	na	8.9E+00	5.5E-02	1.4E-02	na	8.9E+00	5.5E-02	1.4E-02	na	8.9E+00
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	5.5E-02	1.4E-02	na	8.9E+00	5.5E-02	1.4E-02	na	8.9E+00	5.5E-02	1.4E-02	na	8.9E+00
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	5.5E-02	1.4E-02	--	--	5.5E-02	1.4E-02	--	--	5.5E-02	1.4E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	na	8.9E+00	--	--	na	8.9E+00	--	--	na	8.9E+00
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	6.0E-02	2.2E-02	9.0E-03	na	6.0E-03	2.2E-02	9.0E-03	na	6.0E-03	2.2E-02	9.0E-03	na	6.0E-03
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.0E-01	--	--	na	3.0E-02	--	--	na	3.0E-02	--	--	na	3.0E-02

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	-	-	na	2.1E+03	-	-	na	2.1E+03	-	-	na	2.1E+02	-	-	na	2.1E+02	-	-	na	2.1E+02
Fluoranthene	0	-	-	na	1.4E+02	-	-	na	1.4E+02	-	-	na	1.4E+01	-	-	na	1.4E+01	-	-	na	1.4E+01
Fluorene	0	-	-	na	5.3E+03	-	-	na	5.3E+03	-	-	na	5.3E+02	-	-	na	5.3E+02	-	-	na	5.3E+02
Foaming Agents	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Guthion	0	-	1.0E-02	na	-	-	1.0E-02	na	-	-	2.5E-03	na	-	-	2.5E-03	na	-	-	2.5E-03	na	-
Heptachlor ^c	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	9.8E-03	1.3E-01	9.5E-04	na	7.9E-05	1.3E-01	9.5E-04	na	9.8E-04	1.3E-01	9.5E-04	na	9.8E-04
Heptachlor Epoxide ^c	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	4.8E-03	1.3E-01	9.5E-04	na	3.9E-05	1.3E-01	9.5E-04	na	4.8E-04	1.3E-01	9.5E-04	na	4.8E-04
Hexachlorobenzene ^c	0	-	-	na	2.9E-03	-	-	na	3.6E-02	-	-	na	2.9E-04	-	-	na	3.6E-03	-	-	na	3.6E-03
Hexachlorobutadiene ^c	0	-	-	na	1.8E+02	-	-	na	2.2E+03	-	-	na	1.8E+01	-	-	na	2.2E+02	-	-	na	2.2E+02
Hexachlorocyclohexane	0	-	-	na	4.9E-02	-	-	na	6.1E-01	-	-	na	4.9E-03	-	-	na	6.1E-02	-	-	na	6.1E-02
Alpha-BHC ^c	0	-	-	na	1.7E-01	-	-	na	2.1E+00	-	-	na	1.7E-02	-	-	na	2.1E-01	-	-	na	2.1E-01
Beta-BHC ^c	0	-	-	na	1.8E+00	-	-	na	2.2E+01	9.5E-01	-	na	1.8E-01	2.4E-01	-	na	2.2E+00	2.4E-01	-	na	2.2E+00
Hexachlorocyclohexane	0	-	-	na	1.1E+03	-	-	na	1.1E+03	-	-	na	1.1E+02	-	-	na	1.1E+02	-	-	na	1.1E+02
Gamma-BHC ^c (Lindane)	0	-	-	na	3.3E+01	-	-	na	4.1E+02	-	-	na	3.3E+00	-	-	na	4.1E+01	-	-	na	4.1E+01
Hexachlorocyclopentadiene	0	-	-	na	2.0E+00	-	2.0E+00	na	-	-	5.0E-01	na	-	-	5.0E-01	na	-	-	5.0E-01	na	-
Hexachloroethane ^c	0	-	-	na	1.8E-01	-	-	na	2.2E+00	-	-	na	1.8E-02	-	-	na	2.2E-01	-	-	na	2.2E-01
Hydrogen Sulfide	0	-	-	na	9.6E+03	-	-	na	1.2E+05	-	-	na	9.6E+02	-	-	na	1.2E+04	-	-	na	1.2E+04
Indeno (1,2,3-cd) pyrene ^c	0	-	-	na	0.0E+00	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-
Iron	0	4.5E+01	5.1E+00	na	-	4.5E+01	5.1E+00	na	-	1.1E+01	1.3E+00	na	-	1.1E+01	1.3E+00	na	-	1.1E+01	1.3E+00	na	-
Isophorone ^c	0	-	1.0E-01	na	-	-	1.0E-01	na	-	-	2.5E-02	na	-	-	2.5E-02	na	-	-	2.5E-02	na	-
Kepone	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Lead	0	-	-	na	7.7E-01	-	7.7E-01	na	-	3.5E-01	1.9E-01	na	-	3.5E-01	1.9E-01	na	-	3.5E-01	1.9E-01	na	-
Malathion	0	-	-	na	1.5E+03	-	-	na	1.5E+03	-	-	na	1.5E+02	-	-	na	1.5E+02	-	-	na	1.5E+02
Manganese	0	-	-	na	5.9E+03	-	-	na	7.3E+04	-	-	na	5.9E+02	-	-	na	7.3E+03	-	-	na	7.3E+03
Mercury	0	-	3.0E-02	na	-	-	3.0E-02	na	-	-	7.5E-03	na	-	-	7.5E-03	na	-	-	7.5E-03	na	-
Methyl Bromide	0	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-
Methylene Chloride ^c	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Methoxychlor	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Mirex	0	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-
Nickel	0.53	9.6E+01	1.1E+01	na	4.6E+03	9.6E+01	1.1E+01	na	4.6E+03	2.4E+01	3.1E+00	na	4.6E+02	2.4E+01	3.1E+00	na	4.6E+02	2.4E+01	3.1E+00	na	4.6E+02
Nitrate (as N)	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Nitrobenzene	0	-	-	na	6.9E+02	-	-	na	6.9E+02	-	-	na	6.9E+01	-	-	na	6.9E+01	-	-	na	6.9E+01
N-Nitrosodimethylamine ^c	0	-	-	na	3.0E+01	-	-	na	3.7E+02	-	-	na	3.0E+00	-	-	na	3.7E+01	-	-	na	3.7E+01
N-Nitrosodiphenylamine ^c	0	-	-	na	6.0E+01	-	-	na	7.4E+02	-	-	na	6.0E+00	-	-	na	7.4E+01	-	-	na	7.4E+01
N-Nitrosodi-n-propylamine ^c	0	-	-	na	5.1E+00	-	-	na	6.3E+01	-	-	na	5.1E-01	-	-	na	6.3E+00	-	-	na	6.3E+00
Nonylphenol	0	2.8E+01	6.6E+00	-	-	2.8E+01	6.6E+00	na	-	7.0E+00	1.7E+00	na	-	7.0E+00	1.7E+00	na	-	7.0E+00	1.7E+00	na	-
Parathion	0	6.5E-02	1.3E-02	na	-	6.5E-02	1.3E-02	na	-	1.6E-02	3.3E-03	na	-	1.6E-02	3.3E-03	na	-	1.6E-02	3.3E-03	na	-
PCB Total ^c	0	-	1.4E-02	na	6.4E-04	-	1.4E-02	na	7.9E-03	-	3.5E-03	na	6.4E-05	-	3.5E-03	na	7.9E-04	-	3.5E-03	na	7.9E-04
Pentachlorophenol ^c	0	6.8E+00	5.2E+00	na	3.0E+01	6.8E+00	5.2E+00	na	3.7E+02	1.7E+00	1.3E+00	na	3.0E+00	1.7E+00	1.3E+00	na	3.7E+01	1.7E+00	1.3E+00	na	3.7E+01
Phenol	0	-	-	na	8.6E+05	-	-	na	8.6E+04	-	-	na	8.6E+04	-	-	na	8.6E+04	-	-	na	8.6E+04
Pyrene	0	-	-	na	4.0E+03	-	-	na	4.0E+03	-	-	na	4.0E+02	-	-	na	4.0E+02	-	-	na	4.0E+02
Radionuclides	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Gross Alpha Activity (pCi/L)	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Beta and Photon Activity (mem/yr)	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Radium 226 + 228 (pCi/L)	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-
Uranium (ug/l)	0	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-	-	-	na	-

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	4.2E+02	na	5.0E+00	1.3E+00	4.2E+02	5.0E+00	1.3E+00	na
Silver	0	9.3E-01	--	na	--	9.3E-01	--	na	--	na	2.3E-01	--	--	2.3E-01	--	na
Sulfate	0	--	--	na	--	--	--	na	--	na	--	--	--	--	--	na
1,1,2,2-Tetrachloroethane ^c	0	--	--	na	4.0E+01	--	--	na	5.0E+02	na	--	--	5.0E+01	--	--	na
Tetrachloroethylene ^c	0	--	--	na	3.3E+01	--	--	na	4.1E+02	na	--	--	4.1E+01	--	--	na
Thallium	0	--	--	na	4.7E+01	--	--	na	4.7E-02	na	--	--	4.7E-02	--	--	na
Toluene	0	--	--	na	6.0E+03	--	--	na	6.0E+02	na	--	--	6.0E+02	--	--	na
Total dissolved solids	0	--	--	na	--	--	--	na	--	na	--	--	--	--	--	na
Toxaphene ^c	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	3.5E-02	na	1.8E-01	5.0E-05	3.5E-03	1.8E-01	5.0E-05	na
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	na	1.2E-01	1.8E-02	--	1.2E-01	1.8E-02	na
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.0E+00	na	--	--	7.0E+00	--	--	na
1,1,2-Trichloroethane ^c	0	--	--	na	1.6E+02	--	--	na	2.0E+03	na	--	--	2.0E+02	--	--	na
Trichloroethylene ^c	0	--	--	na	3.0E+02	--	--	na	3.7E+03	na	--	--	3.7E+02	--	--	na
2,4,6-Trichlorophenol ^c	0	--	--	na	2.4E+01	--	--	na	3.0E+02	na	--	--	3.0E+01	--	--	na
2-(2,4,5-Trichlorophenoxy)propanoic acid (Silvex)	0	--	--	na	--	--	--	na	--	na	--	--	--	--	--	na
Vinyl Chloride ^c	0	--	--	na	--	--	--	na	--	na	--	--	--	--	--	na
Zinc	0	6.2E+01	6.2E+01	na	2.6E+04	6.2E+01	6.2E+01	na	2.4E+01	na	1.5E+01	1.6E+01	3.0E+01	1.5E+01	1.6E+01	na

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.4E+01
Arsenic	2.3E+01
Barium	na
Cadmium	9.4E-02
Chromium III	6.0E+00
Chromium VI	1.6E+00
Copper	7.3E-01
Iron	na
Lead	7.7E-01
Manganese	na
Mercury	1.2E-01
Nickel	1.8E+00
Selenium	7.5E-01
Silver	9.3E-02
Zinc	6.2E+00

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Stats - TRC (2).txt

9/8/2009 4:39:00 PM

Facility = Clifton Forge WTP
Chemical = TRC
Chronic averaging period = 4
WLAa = 11
WLAC = 19
Q.L. = 100
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 4000
Variance = 5760000
C.V. = 0.6
97th percentile daily values = 9733.67
97th percentile 4 day average = 6655.16
97th percentile 30 day average = 4824.21
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 11
Average Weekly limit = 11
Average Monthly Limit = 11

The data are:

4000

Table 7-7: Phosphorus Waste Load Allocations - Major Dischargers

Facility Name	VPDES Permit	Discharge Flow (MGD)	TP Conc. (mg/L)	TP Load Allocation (lbs/growing season)	PO4-P Conc. (mg/L)	PO4-P Load Allocation (lbs/growing season)
MeadWestvaco	VA0003646	35	1.5	66,991	0.21*	9,379
Covington STP	VA0025542	3	0.5	1,914	0.335	1,282
Low Moor WWTP	VA0027979	0.3	1.15	440	0.7705	295
Lower Jackson River WWTP	VA0090671	2.6	0.5	1,659	0.335	1,111
Total				71,004	-	12,068

*Measured as filtered orthophosphorus

Table 7-8: Total Nitrogen Waste Load Allocations During the Growing Season Major Dischargers

Facility Name	VPDES Permit	Discharge Flow (MGD)	TN Conc. (mg/L)	TN Load (lbs/growing season)
MeadWestvaco	VA0003646	35	3.7	165,245
Covington STP	VA0025542	3	6	22,968
Low Moor WWTP	VA0027979	0.3	14	5,359
Lower Jackson River WWTP	VA0090671	2.6	6	19,906
Total				213,478

The allocation for Low Moor WWTP and Lower Jackson River WWTP reflect the aggregated mass load nutrient given to Alleghany County pursuant to 9VAC 25-820-70, Part 1.B.2, otherwise referred to as a "bubble". Accordingly, compliance is determined solely on an aggregate basis rather than by comparison of individual facility waste load allocations.

In addition to the major dischargers, there are 9 active minor facilities holding active individual discharge permits in the Jackson River watershed (4 industrial facilities and 5 municipal facilities). The 4 minor industrial facilities discharge very low level of nutrients. Based on DMR data for a few industrial facilities, the average discharge TP is approximated at 0.34 mg/L and 0.14 mg/l for total nitrogen and total phosphorus, respectively. **Table 7-9** presents the WLAs for the 4 minor industrial facilities for total phosphorus and total nitrogen respectively.

**Table 7-9: Total Nitrogen and Total Phosphorus Waste Load Allocations
Minor Industrial Facilities**

Permit Number	Facility Name	Design Flow (gpd)	TP Load (lbs/growing season)	TN Load (lbs/growing season)
VA0003450	Applied Extrusion Technologies	1,000,000	178.4	395.0
VA0006076	Clifton Forge Water Treatment Plant	50,000	8.9	19.7
VA0003344	CSX Transportation Inc - Clifton Forge	25,000	4.5	9.9
VA0091324	DGIF Paint Bank Fish Cultural Station	2,900,000	517.3	1145.4
		Total	709	1,570

The nutrient allocations for the 5 minor municipal dischargers are developed using recommended literature values related to primary treatment levels for total phosphorus (10 mg/L) and total nitrogen (40 mg/L) (Thomann, 1987). **Table 7-10** presents the WLAs for the 5 minor municipal facilities for total phosphorus and total nitrogen respectively.

Table 7-10: Total Phosphorus Waste Load Allocations – Minor Municipal Facilities

Permit Number	Facility Name	Design Flow (gpd)	TP (lbs/growing season)	TP (lbs/growing season)
VA0088544	Boys Home Inc STP	24,000	305.8	1223.1
VA0032115	Morris Hill STP	15,000	191.1	764.4
VA0088552	Sponaugle Subdivision	16,000	203.9	815.4
VA0090646	Tanglewood Manor Home for Adults	18,000	229.3	917.3
VA0075574	VDOT I64 Rest Area - Alleghany County	15,000	191.1	764.4
			1,121.2	4,484.8

There are also 18 general permits in the Jackson River watershed; 3 permits issued to domestic sewage facilities 11 stormwater permits issued to industrial sites, 2 permits issued to mines, 1 stormwater permit issued to a construction site, and 1 stormwater permit issued to a concrete facility.

The WLA for the domestic sewage facilities were developed using similar nutrient discharge assumption as the one used the minor municipal facilities along with a maximum discharge flow of 1,000 gallons per day. **Table 7-11** presents the total phosphorus and total nitrogen WLAs for the 3 domestic sewage facilities.

Attachment G

Sludge Analysis

RECEIVED

March 20, 1996

MAR 22 1996

Mr Jeffrey T Hancock, Environmental Engineer
Virginia DEQ, WCRO
P O Box 7017
Roanoke, Virginia 24019

DEQ - WATER DIVISION
ROANOKE VA

Subject Sludge Analyses, Clifton Forge's Water Treatment Plant

Dear Mr Hancock

During our meeting in your office in November, it was proposed that Clifton Forge test the backwash water to determine if there are any constituents in the backwash which could cause groundwater contamination. Groundwater standards were to be used for comparison. This letter/report summarizes the results of sludge sampling at the City's water plant.

On February 22, 1996, EARTH TECH personnel collected a grab sample of sludge from the pipe that discharges fresh sludge to the lagoon. The sample was submitted for analyses on the same date. The sample was analyzed for total metals, surfactants-as methylene blue active substances (MBAS), total petroleum hydrocarbons (TPH), cyanide, phenols, total organic halogens (TOX [surrogate analysis for chlorinated compounds]), nitrogen, alkalinity, total dissolved solids (TDS), fluoride, color, total organic carbon (TOC), sulfates, chlorides, and pH. Results of the analyses are summarized in the following table. The laboratory certificate of analysis is also attached.

Telephone

804 977 1498

Facsimile

804 977 6778

Table 1 Comparison of Sludge Sampling Results and Groundwater Standards

Analysis	QL	Sludge Sample Result	Groundwater Standard/ (Criteria)
Alkalinity (mg/L)	10	30	(30-500)
Ammonia (mg/L)	10	BQL	0.025 -
Chloride (mg/L)	10	3.4	(25)
Color (color units)	50	BQL	(15)
Cyanide (mg/L)	0.02	BQL	0.005 -
Fluoride (mg/L)	0.1	BQL	(1.4)
MBAS (mg/L)	0.10	BQL	0.05 -
Nitrate (mg/L)	0.1	BQL	5
Nitrite (mg/L)	0.01	0.01	0.025
*pH (pH units)	0.10	6.83	6-9
Phenols (mg/L)	0.005	BQL	0.001 -
Sulfate (mg/L)	30	24	(100)
TOC (mg/L)	0.9	8.2	(10)
TOX† (µg/L)	10	11	NS
TDS (mg/L)	10	36	(500)
TPH-IR (mg/L)	20	5.1	1

Mr Dick Magnifico
March 18, 1996
Page 2 of 3

Mr Hancock
March 20, 1996
page 2

Table 1 cont			
Analysis	QL	Sludge Sample Result	Groundwater Standard/ (Criteria)
Total Metals (mg/L)			
Arsenic (As)	0 020	0 050	0 05
Barium (Ba)	0 01	0 04	1 0
Cadmium (Cd)	0 005	0 005	0 0004
Chromium	0 01	BQL	0 05
Copper (Cu)	0 01	0 02	1 0
Lead (Pb)	0 001	0 009	0 05
Mercury (Hg)	0 0001	0 0004	0 00005
Selenium (Se)	0 005	BQL	0 01
Silver (Ag)	0 01	0 02	None
Sodium (Na)	1 0	BQL	25
Zinc (Zn)	0 01	0 13	0 05

* - pH analysis exceeded holding time

mg/L - milligrams per liter, µg/L - micrograms per liter

QL - Quantitation Limit

BQL - Below Quantitation Limit

Bold Indicates sample exceeds or possibly exceeds groundwater standards/(criteria)

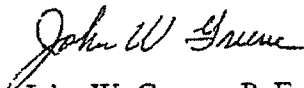
NS - No Standard

† - TOX was used as a surrogate analysis for several chlorinated compounds

Thank you for your assistance in this matter If you have questions, please call

Sincerely

EARTH TECH


John W. Greene, P E

Copy Mr Dick Magnifico, City Manager
Mr Brandon Nicely, Director of Public Works
Mr Bobby Irvine, Water Treatment Plant Superintendent

File C100/23 3/2 Project Number 7441 801

Attachment H

TMP Justification Memorandum

MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY BLUE RIDGE REGIONAL OFFICE

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: TMP for Permit Reissuance for Clifton Forge WTP - VA0006076

TO: Permit File

FROM: Kevin Harlow, BRRO - Roanoke

DATE: September 3, 2014

General Information

The Town of Clifton Forge Water Treatment Plant discharges a maximum daily flow of 0.1 MGD and an average flow of 0.05 MGD. Wastewater is generated from the backwashing of the two filters (0.024 MGD each), from the two mixing basins (0.025 MGD, twice per year), and from the sedimentation basin (0.15 mgd, four days per year).

Based on the previous agency TMP guidance, the permittee maintained an average effluent flow of 0.05 mgd or less in order to not have TMP permit requirements. The permittee has operated and maintained a magnetic flow meter on the discharge to demonstrate that the facility meets the discharge flow TMP criteria. However, current agency TMP guidance (GM00-2012) suggests that all water treatment plants test for toxicity unless there is enough data to demonstrate a lack of toxicity.

Recommendations - Biological Testing

Outfall 001

It is recommended that annual acute toxicity testing begin for evaluation of the toxicity of the discharge associated with the sedimentation basin clean-out using *Ceriodaphnia dubia* and *Pimephales promelas* for multi-dilutional, NOAEC=100% acute testing:

1. Guidance Memo 00-2012 recognizes water treatment plant discharges as discharges with the potential to be toxic. There is no toxicity data on file to determine that additional monitoring is not required.

Attachment I

Industrial Permit Rating Worksheet

_____ Regular Addition
 _____ Discretionary Addition
 _____ Score change, but no
 status change
 _____ Deletion

Facility Name:

City: C | i | f | t | o | n | F | o | r | g | e | | | | | | | | | | | | | | | |

Reach Number: | V | A | W | - | I | 0 | 9 | R | | | | |

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

- ____ YES; score is 700 (stop here)
x NO (continue)

YES: score is 600 (stop here) x NO (continue)

PCS SIC Code: |_|_|_|_| Primary SIC Code: |_4_|_9_|_4_|_1_|

Other SIC Codes: |_|_|_| |_|_|_| |_|_|_| |_|_|_|

Industrial Subcategory Code: | 0 | 0 | 0 | (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
___ No process waste streams	0	0	___ 3.	3	15	___X___ 7.	7	35
___ 1.	1	5	___ 4.	4	20	___ 8.	8	40
___ 2.	2	10	___ 5.	5	25	___ 9.	9	45
			___ 6.	6	30	___ 10.	10	50

Code Number Checked: | 0 | 7 |

Total Points Factor 1: | 3 | 5 |

FACTOR 2: Flow/Stream Flow Volume *(Complete Either Section A or Section B; check only one)*

Section A--Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I:	Flow < 5 MGD	11	0
	Flow 5 to 10 MGD	12	10
	Flow > 10 to 50 MGD	13	20
	Flow > 50 MGD	14	30
Type II:	Flow < 1 MGD	21	10
	Flow 1 to 5 MGD	22	20
	Flow > 5 to 10 MGD	23	30
	Flow > 10 MGD	24	50
Type III:	Flow < 1 MGD	31	0
	Flow 1 to 5 MGD	32	10
	Flow > 5 to 10 MGD	33	20
	Flow > 10 MGD	34	30

Section B--Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow	Code	Points
Type I/III:	< 10% _____	41	0
	≥ 10% to < 50% _____	42	10
	≥ 50% <u> X </u>	43	20
Type II:	<10% _____	51	0
	≥ 10% to < 50% _____	52	20
	> 50% _____	53	30

Code Checked from Section A or B: | 4 | 3 |

Total Points Factor 2: | 2 | 0 |

NPDES Permit Rating Work Sheet

NPDES No.: VA0006076

FACTOR 5: Water Quality Factors

- A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge?

		Code	Points
<u>X</u>	Yes	1	10
<u> </u>	No	2	0

- B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
<u>X</u>	Yes	1	0
<u> </u>	No	2	5

- C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole ~~est~~ toxicity?

		Code	Points
<u> </u>	Yes	1	10
<u>X</u>	No	2	0

Code Number Checked: A 1 B 1 C 2
 Points Factor 5: A 10 + B 0 + C 0 = 10 TOTAL

FACTOR 6: Proximity to Near Coastal Waters N/A

- A. Base Score: Enter flow code here (from Factor 2): 43

Enter the multiplication factor that corresponds to the flow code: 01

Check appropriate facility HPRI Code (from PCS):

HPRI #	Code	HPRI Score	Flow Code	Multiplication Factor
<u> </u>	1	1	20	0.00
<u> </u>	2	2	0	0.05
<u> </u>	3	3	30	0.10
<u>X</u>	4	4	0	0.15
<u> </u>	5	5	20	0.10
			21 or 51	0.30
			22 or 52	0.60
			23 or 53	1.00
			24	

HPRI code checked: 4

Base Score: (HPRI Score) 0 x (Multiplication Factor) 0.1 = 0 (TOTAL POINTS)

- B. Additional Points--NEP Program

For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

N/A

		Code	Points
<u> </u>	Yes	1	10
<u> </u>	No	2	0

- C. Additional Points--Great Lakes Area of Concern

For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see instructions)

N/A

		Code	Points
<u> </u>	Yes	1	10
<u> </u>	No	2	0

Code Number Checked: A N/A B N/A C N/A
 Points Factor 5: A + B + C = 0 TOTAL

NPDES Permit Rating Work Sheet

NPDES NO: LVLA00006076

SCORE SUMMARY

Factor	Description	Total Points
1	Toxic Pollutant Potential	<u>35</u>
2	Flow/Stream Flow Volume	<u>20</u>
3	Conventional Pollutants	<u>00</u>
4	Public Health Impacts	<u>00</u>
5	Water Quality Factors	<u>10</u>
6	Proximity to Near Coastal Waters	<u>00</u>
TOTAL (Factors 1-6)		<u>65</u>

S1. Is the total score equal to or greater than 80? ☐ Yes (Facility is a major) ☒ No

S2. If the answer to the above question is no, would you like this facility to be discretionary major?

☒ No

☐ Yes (add 500 points to the above score and provide reason below:

Reason: _____

NEW SCORE: 65

OLD SCORE: 65 (Total Points were previously added incorrectly)

Kevin Harlow
Permit Reviewer's Name

(540) 562 - 6788
Phone Number

September 3, 2014
Date